Working Group on Statistical Learning Seminar

Title: A latent variable approach to infer food intake using multiple metabolomic biomarkers

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Date: Mon 17th February 2020 at 12:00PM

Location: Seminar Room SCN 1.25

Abstract: Often times the only way to assess dietary intake is by referring to information self-reported by the same subjects object of the assessment. Such self-reported data are intrinsically subjective and potentially biased, and problems surrounding the use of this single tool to assess intake are well documented in the literature. In recent years, dietary biomarkers have emerged as new instruments, capable of providing more objective measures of intake. While research on novel biomarkers discovery is quite vibrant, only a few approaches have been proposed to then link proposed biomarkers and actual nutrient/food intake. In this context, the majority of works have dealt with a uni-dimensional representation of the problem, using a single intake type - single biomarker binomial to quantify a given nutrient/food intake. Few approaches have tried to describe nutrient/food intake using biomarkers panels. However, all of these studies only attempted to analyse the relationship between multiple biomarkers values and classes of intake (e.g. low and high portions). We propose a factor analytic model to estimate nutrient/food intake from a panel of biomarkers. The model is able to generalize the relationship observed in an experimental setting between nutrient/food intake and a panel of dietary biomarkers, to allow both intake quantification and intake prediction, when in presence of biomarker measurements alone. The proposed framework is illustrated through an extensive simulation study

and a real world application to peas intake data.